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ORIGINAL ARTICLE

Frequency and characteristics of febrile convulsions among children in Belbeis family health center.

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ABSTRACT

Background: Febrile convulsion (FC) is the most common neurologic disorder in childhood. It is a major challenge in pediatric and family practice because of its high incidence in young children and its tendency to recur. **Objective**: To determine the frequency and characteristics of febrile convulsions among children attending Belbeis family health center. **Methods**: A cross-sectional study was conducted on 272 children aged (6months up to 5 years) in Belbeis Family Health Center from April to July 2019, using a predesigned questionnaire to assess the sociodemographic characteristics and structured one to assess the attack characteristics. The sample units were collected by the cluster technique. **Results**: Frequency of febrile convulsions among the studied children was 8.8%. Most of them had only a single attack; the initial episode was in age younger than 1 year, most of studied (90.6%) family had a negative history of FC among siblings, duration of the FC attack ≤ 5 minutes in 65% of them, and cyanosis occurred during the attack only in 18% of them. There is no significant difference between children with febrile convulsions and children without febrile convulsions regarding age, sex, and socioeconomic status. **Conclusion**: FC had a high incidence in young children and it also tended to recur, so it represents a major challenge in pediatrics and family medicine practice. We recommend that similar studies on a larger sample of children at different areas of care like inpatient, ED and primary health units should be carried out.

Keywords: Febrile convulsion, Frequency, Health center.

INTRODUCTION

Febrile convulsion (FC) is the most common neurologic disorder in childhood. Febrile convulsion is generally defined as seizures occurring in children typically 6 months to 60 months (5 years) of age in association with a fever greater than 38°C (100.4°F), who do not have evidence of an intracranial cause (e.g. infection, head trauma, and epilepsy), another definable cause of seizure (e.g. electrolyte imbalance, hypoglycemia, drug use, or drug withdrawal), or a history of an afebrile seizure [(1)]. The peak incidence of the febrile convulsion is at18month. Approximately 6-15% of febrile convulsions occur after the age of 4 years and onset after 6 years is very unusual [(2)]. Children of all ethnic groups may present with FC, there is a higher prevalence in some ethnic groups, in particular Guamanians (14%), Japanese (6%–9%), and Indians (5%–10%) but lower in others as in Europe and USA is estimated 2–5 % of the pediatric population [(3)]. The cause for this geographical variation is not known. It is speculated that it may be due to different genetic predisposition

as well as the influence of environmental factors [4].

A febrile convulsion is believed to be genetically determined and maternal inheritance is an important factor. Siblings of patients with epilepsy are at increased risk of FC. The most common extracranial sources of fever in cases of FC are upper respiratory tract infection, otitis media, pneumonia, influenza, gastroenteritis, or urinary tract infection [5].

A febrile convulsion is divided into two types, simple and complex febrile seizures. a simple febrile seizure is generalized, lasting less than 15 minutes and occurs once in 24 hours, whereas complex febrile seizures are seizures that have one or more of the following features: prolonged duration of more than 15 minutes, focal features, or recurrence within 24 hours of the first episode [6].

Despite having a good prognosis, a febrile convulsion is a very difficult condition for parents to handle. Concerns about the future health of the child are the most common cause of fear among the parents [7]. Many parents may even develop fever phobia and each febrile episode of the child can be a nightmare for the parents. when parents see their child's convulsion they are understandably shocked and many think that the child may die [8]. FC does not usually last long; however, correct management can prevent complications such as head injury, mouth and teeth injury, and neck suffocation [9].

Up to my knowledge there were no studies determined the frequency of febrile convulsion in children in Egypt so the current study aimed to decrease morbidity and mortality of febrile convulsion through determining the frequency and characteristics of the attack among children attending Belbeis family health center.

SUBJECTS AND METHODS

Type of study

A cross-section study.

Study setting and time

This study was conducted during the period from February 2019 to July 2019 and applied in Belbeis city Family Health Center, Sharkia governorate, which was selected because of its accessibility and it is the only family health center which serves the whole city.

Study population:

Inclusion criteria

- Children of both sexes aged from 6 months to 5 years attending Belbeis family health center asking for any medical services.

Exclusion criteria

- Children aged less than 6 months or more than 5 years.
- Children diagnosed with afebrile convulsions even if recurrent or convulsions secondary to organic disease e.g.; cerebral palsy, meningitis, encephalitis, severe head trauma or intracranial tumors.

Sample size and technique

For assessing the frequency of FC, the sample was calculated to be 272 children. As the children's attendance rate in Belbeis family health center is 7648 in one year and the prevalence of febrile convulsion in children is about 10% [1] using EPI INFO at power 80% and C.I 95%. The sample units were collected by the cluster technique (participants attending the family health center asking for different health services). The participants asked about the history of FC (single attack or recurrent), characteristics of the attack, and their socioeconomic status.

Study tools

-A predesigned questionnaire by Fahmy and his colleagues [10] to assess the socioeconomic status by asking about (mother and father education, working status, availability of safe sewage disposal and water supply, income, ……..)

-A structured questionnaire about febrile convulsion characteristics regarding timing of the initial episode, duration of the attack, number of episodes, cyanosis during the attack and number of the child siblings with FC history.

Fieldwork

During the visit, all participants were subjected to:

1- Building initial rapport with all children's parents who included in this study.

2- Assessment of socioeconomic status by Fahmy et al., 2015 [10] questionnaire.

3- Determining the frequency and the characteristics of FC among children

attending Belbeis Family Health Center by attending the health center 3 hours/day, 2 days /week, each participant needed 20 minutes to fill the questionnaires.

Data analysis

• The collected data were analyzed by computer using Statistical Package of Social Services version 24 (SPSS), Data were represented in tables and graphs, Continuous Quantitative variables e.g. age were expressed as the mean ± SD & median (range), and categorical qualitative variables were expressed as absolute frequencies (number) & relative frequencies (percentage).

• Social class was classified according to Fahmy and his colleagues [(10)] into high (33.6–48), medium (19.2-<33.6), and low (<19.2) depending on the score calculated (48).

• Suitable statistical tests of significance (as chi square test, fisher exact test) were used after checked for normality. The results were considered statistically significant when the significant probability was less than 0.05 ($P < 0.05$). P-value < 0.001 was considered highly statistically significant (HS), and P-value ≥ 0.05 was considered statistically insignificant (NS).

Administrative and ethical design

- The study protocol was approved from the ethical committee at the Faculty of Medicine Zagazig University and IRB "institutional review board" (IRB#:4129/8-11-2017).
- Informed consent was obtained from all children's parents participated in this study after explanation of the questionnaires items and the aim of the study.
- Permissions from family medicine department and from Belbeis family health center where the study was carried out.
- The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

RESULTS

The median age of the studied children was 3.5 years old, with a range from 7 months to 5 years old, about half of them were male (47.4 %), while 52.6% of them were females, Fathers of about 1/3 of the studied group were university-educated (37.9%) versus 31.6% of mothers were university educated, despite that 3/4 of them were not working(75%) and only 12.5% of the studied families use computer lots of times, only 2.9% of the studied families had Enough and saving income, and 52.9% of them have family members less than 5 member , most of them (96.7%) reached Sewage /refuse disposal system and most of the studied families have moderate socioeconomic status and high socioeconomic status (53.7% and 41.2%) respectively, only 5.1 % of them of low social class, and half of the studied families were core family (Table 1).

Frequency of febrile convulsions among the studied children was 8.8% (Figure 1).

Table (2) shows that there is no significant difference between children with febrile convulsions and children without febrile convulsions regarding age, sex, and socioeconomic status.

Child's age at the time of the initial FC episode was < 12 months in 40.6 % of them and 1-2 years in 31.3% of them, only 37.5% had recurrent attacks , most of studied (90.6%) family had a negative history of FC among siblings, duration of the FC attack ≤ 5 minutes in 65% of them, and cyanosis occurred during the attack only in 18% of them (Table 3).

Table (1): Sociodemographic characteristics of the studied families (N=272)

Socioeconomic characteristics	Item	the studied group (N=272)	
		No.	%
Age	Mean	3.23 ± 1.49	
	Median (Range)	3.5 (7 months-5 years)	
Sex	Male	129	47.4
	Female	143	52.6
Education of father	Illiterate/Read & write	34	12.5
	Primary	25	9.2
	Secondary	110	40.4
	University	103	37.9
Education of mother	Illiterate/ Primary	51	18.7
	Preparatory	9	3.3
	Secondary	126	46.3
	University	86	31.6
Occupation of father	No	17	6.3
	Yes	255	93.8
Occupation of mother	No	204	75.0
	Yes	68	25.0
Computer use	Never	100	36.8
	Sometimes	138	50.7
	A lot of times	34	12.5
Per-capita income	Not enough	37	13.6
	Enough only	227	83.5
	Enough and saving	8	2.9
Number of family members	≥7	9	3.3
	6	8	2.9
	5	111	40.8
	<5	144	52.9
Crowding index	≥2-<4	144	52.9
	<2	128	47.1
Sewage /refuse disposal	No	9	3.3
	Yes	263	96.7
Social class	Low (<40%)	14	5.1
	Moderate (40-<70%)	146	53.7
	High level (≥70%)	112	41.2
Family structure	Core family	136	50.0
	Extended family	136	50.0

Table (2): Relation between sociodemographic characteristics and febrile convulsion among the studied children (N=272)

Socioeconomic characteristics	Item	With FC (N=24)		Without FC (N=248)		p-value
		No.	%	No.	%	
Age in years	Mean	3.23 ± 1.49		3.33 ± 1.5		0.730
	Median (Range)	3.5 (0.5 -5)		3.6 (7 months-5)		
Sex	Male	10	41.7	119	48.0	0.670
	Female	14	58.3	129	52.0	
Education of father	Illiterate/Read & write	5	20.9	29	11.7	0.679
	Primary	3	15.5	22	8.9	
	Secondary	8	33.3	102	41.1	
	University	8	33.3	95	38.3	
Education of mother	Illiterate/ Primary	5	20.9	46	18.5	0.986
	Preparatory	1	4.2	8	3.2	
	Secondary	10	4.7	116	46.8	
	University	8	33.3	78	31.5	
Occupation of father	No	2	8.3	15	6	0.652
	Yes	22	91.7	233	94.0	
Occupation of mother	No	19	79.2	185	74.6	0.806
	Yes	5	20.8	63	25.4	
Computer use	Never	10	41.7	90	36.3	0.862
	Sometimes	11	45.8	127	51.2	
	A lot of times	3	12.5	31	12.5	
Per-capita income	Not enough	2	8.3	33	14.0	0.647
	Enough only	21	87.5	206	83.2	
	Enough and saving	1	4.2	7	2.8	
Number of family members	≥7	1	4.2	8	3.2	0.971
	6	1	4.2	7	2.8	
	5	10	41.7	101	40.7	
	<5	12	50.0	132	53.2	
Crowding index	≥2-<4	13	54.2	131	52.8	1.000
	<2	11	45.8	117	47.2	
Sewage /refuse disposal	No	1	4.2	8	3.2	0.570
	Yes	23	95.8	240	46.8	
Social class	Low (<40%)	2	8.3	12	4.8	0.738
	Moderate (40-<70%)	13	54.2	133	53.6	
	High level (≥70%)	9	37.5	103	41.5	

- ***Fiscer exact test***
- ***** Chi square test***

FC :Febrile convulsion

Table (3): Febrile convulsion attack `s characteristics among children with FC (N=24).

Item	the studied group (N=24)	
	No.	%
Child's age at the time of the initial FC episode		
• < 1year	10	40.6
• 1-2 years	7	31.3
• > 2 years	7	28.2
Number of seizure episodes experienced by the child		
• Single	15	62.5
• Recurrent	9	37.5
Number of the child siblings with FC history		
• None	22	90.6
• One	2	9.4
Duration of the attack of FC		
• ≤ 5minutes	16	65
• > 5 minutes	8	35
If cynosis found during the attack		
• No	20	82
• Yes	4	18

FC :Febrile convulsion

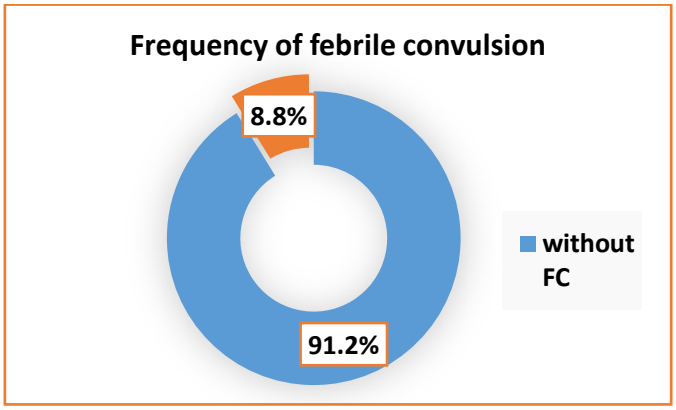

Figure (1): Frequency of febrile convulsions among the studied children (N=272)

DISCUSSION

This study revealed that the frequency of FC among the studied children was 8.8%. This close to a study in Finland by Sillanpää et al [(11)] found a 7.1% incidence rate of FC up to 5 years of age. Also Byeon et al [(12)] in Korean found that the average prevalence of FC in children younger than 5 years based on hospital visit rates was 6.92%, And high in Iran where Delpisheh et al. [(13)] found that the prevalence rate of FC among other childhood convulsions was 47.9%, Almost half of all childhood convulsions among Iranian children are associated with a febrile seizure. On the other hand, the prevalence showed in this study was higher than that obtained from other studies conducted by Baldin et al [(14)] in Iceland showed that FC was reported in 5.1% of children overall, and Ateşoğlu1 et al [(4)] in İzmir, Turkey found that the FC prevalence was 4.8%. Also in Canpolat et al. [(15)] in Kayseri, Turkey and Hwang et al [(16)] in Korea found that prevalence of FC was 4.3% which close to Nilsson et al[(17)] in Sweden discovered that FC in (3.7%) of children. The cause for this geographical variation is not known. It is speculated that it may be due to different genetic predisposition as well as the influence of environmental factors [(4)].

The current study revealed that there is no significant difference between children with FC and children without FC regarding age, sex and socioeconomic status. In consistence with Okubo and Handa[(18)] in the United States demonstrated that patient's age, gender, and socioeconomic status were not risk factors for FC severity. In contrast with Aydin et al. [(19)] in Turkey showed that FC frequency was significantly different according to the fathers' working status, fathers' education, mothers' education and economic status of the family.

This study found that the initial FC had mostly seen in the age of <1 up to 2 years. In the same line, Sfaihi et al. [(20)] in Sfax, Tunisia, Hwang et al. [(16)] in Korea, Srinivasa et al. [(2)] in India revealed that the mean age of this population was 18 months and in 80 % of the cases, the convulsions occurred in children under 2 years of age. This comes into agreement with other studies, Shibeeb et al. [(21)] in Iraq, Sharawat et al. [(22)], Miri Aliabad et al. [(23)], Leung et al. [(1)], Byeon et al. [(12)], and Delpisheh et al. [(13)] who reported that the majority of FC were noted for the first time in the range between 6th and 24th months of age in percentage of 60%.

The current study showed that only 37.5% of children had recurrent attacks. Similarly, Shibeeb et al. [(21)] in Iraq, Leung et al. [(1)], and Ateşoğlu1 et al. [(4)] in İzmir, Turkey found that 31% of febrile convulsive children had more than one attack. In consistence with, Srinivasa et al. [(2)] in India and Canpolat et al. [(15)] in Kayseri, Turkey, showed that 25.4% had recurrent convulsions. Conversely, a study was done by Tosun et al. [(24)] in Turkey revealed that about 50% of the children with FC prone to recurrences. In contrast with Sfaihi et al. [(20)] in Sfax, Tunisia revealed that only 11.7 % of children developed recurrent seizures.

The current study showed that only (9.4%) of studied families had a positive family history

of FC. In agreement with Sfaihi et al. [20] in Sfax, Tunisia revealed that A family history of FC was found (14.7 %). Conversely, Miri Aliabad et al. [23] in Iran and Hwang et al. [16] in Korea revealed that about one-third of studied children had a positive family history.

This study found that duration of the attack ≤ 5 minutes in 65% of them. In consistance with Kanemura et al. [25] in Japan showed duration of seizure <5 min in 94.9% of them.similarly, Elbilgahy and Abd El Aziz [26] in Egypt revealed that 71% of them had convulsion lasts for less than 5 minutes. In contrast with, Miri Aliabad et al. [23] in Iran showed that the majority of patients (78%) had seizure durations less than or equal to 15 minutes. The current study revealed that cynosis occured during the attack only in 18% of them. In contrast with Elbilgahy and Abd El Aziz [26] in Egypt revealed that 63.6% of them having cyanosis during febrile convulsion and Kanemura et al. [25] in Japan showed that cyanosis during FC occured in 66.7 % of them.

CONCLUSION

The study revealed that FC is a common presentation in the children between 6 months and younger than 5 years old with preventable and not dangerous characteristics (mostly of single attack shorter than 5 minutes without cyanosis) that are easy to deal with.

Limitations

- Some mothers refuse the participation in the study due to shortness in their time and long waiting time in the clinic.
- We found some difficuilty in the administrative approvals.

Recommendation

Similar studies on a larger sample of children at different areas of care like inpatient, ED and primary health units should be carried out.

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